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(6) SCADAC: Single-Crystal Automatic Diffractometer and Analogue Computer for X-Ray Analyses*.

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With the successful development of high-speed computing methods in crystallography, the strengthening of statistical phase-determining methods for centric crystals or projections, and the availability of the Okaya-Pepinsky direct method for non-centric structures, the bottleneck in x-ray analyses now becomes that of rapid, accurate data collection.

SCADAC is one of a number of machines designed for automatic collection of single-crystal diffraction data. The machine requires reciprocal lattice vectors as input, and from these solves the Ewald construction, by means of an internal analogue computer. This computer provides information to servo amplifiers which then motor-drive the crystal and scintillation counter detector to positions satisfying the Laue conditions. The crystal and counter then scan the reflection a number of times concommitant with the required accuracy of measurement, after inserting a correct filter and proper scale factor for the scaling circuit. The counts are then printed out at pre-determined intervals of the scan angles, and are also totallized, subtracted from background, and the integrated intensities printed out, on a paper tape, along with the Miller indices, scale and filter factors. Relay circuits permit the avoidance of measurements at reciprocal lattice points where space-group symmetries produce absences.

The machine is constructed in equatorial mounting, to simplify the use of the Ewald construction for non-zero-level reciprocal lattice planes. It can be programmed to follow any given plane curve in reciprocal space, as well as to explore reciprocal lattice nodes.

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